Rapid Spacecraft Development Office News

January 2000

A Message from the Chief of the Rapid Spacecraft Development Office

As many of you have undoubtedly heard, the HORIZON effort at GSFC has come to an end, and I am once again back at the RSDO. Recently, however, I became involved in a new endeavor—the Mars Aerostationary Relay Satellite (MARSAT). Personnel on this project are investigating the viability of placing a combined communications satellite and network node with store and forward capability in orbit around Mars. Using intersatellite and surface links, this satellite would relay communications data between scientific satellites in orbit around Mars, or probes on the planet's surface and the Earth. It is possible that one of the RSDO buses may be utilized for this communications satellite

In addition to my return, we have other personnel changes to report. Both Sharon Collignon, our Contracting Officer, and Scott Greatorex, RSDO Mission Integration Manager, are leaving RSDO. Scott will be serving as the QuikTOMS Observatory Manager. Sharon will be the Contracting Officer for the Earth System Science Pathfinder (ESSP) Project, and will be handling the GRACE, QuikTOMS, CloudSAT, VCL and QuikSCAT missions. We at RSDO would like to thank Scott and Sharon for their hard work here, and wish them all the best in their new positions.

Our latest acquisition contract vehicle, Rapid II, has been in full swing since January 3, with two orders in place already. The first is for the RSDO catalog, which will provide information about the Rapid II spacecraft core buses and their capabilities, making it easier for customers to consider these buses when using GSFC's Integrated Mission Design Center (IMDC). The second order is for a Magnetospheric Mesoscale Satellites (MMS) Study. There are two articles in this issue detailing Rapid II events: one in the CO's Corner by Sharon Collignon, that describes the evaluation process and lists the winners; and one by Ron Miller which details the Rapid II technical news.

Many other RSDO events are also described in this issue. Our New Business Section contains articles about the status of QuikTOMS, SWIFT, and the Magnetospheric Mesoscale Satellites (MMS) Study. Also in the New Business Section is an article about an innovative effort—the RSDO Road Map. The product of this effort is a graphic depicting schedules of current RSDO commitments, and future opportunities for RSDO to provide service to flight projects. The graphic may be viewed on-screen, and is complete with hyperlinks to related NASA Enterprise or project Internet web sites. In the article, you will find a link to the Road Map, so you can preview this useful tool yourself.

In addition, don't miss the article that highlights the capabilities of our newly redesigned web site. Its new features and enhanced security elements will not only make the site more useful to our vendors and customers, it will allow us to perform several internal functions on-line. Another interesting article, Related GSFC Services, describes the services offered to investigators by three other Goddard organizations: the IMDC, the Access To Space Office, and the Instrument Synthesis and Analysis Lab (ISAL).

Please peruse this issue of our newsletter, and as always, if you have any questions or concerns regarding RSDO matters, feel free to contact me at jim.adams@gsfc.nasa.gov.

The Contracting Officer's Corner

- Award of Rapid II Contracts
- Please Don't Forget...

Award of Rapid II Contracts

The Rapid II Evaluation Team completed its evaluation of proposals and awarded contracts on schedule last month for the Rapid II Spacecraft Acquisition. The team evaluated proposals submitted by eight offerors for sixteen different spacecraft buses. The evaluation resulted in an award of six contracts for fourteen spacecraft buses and options.

The evaluation process represented yet another "out-of-the-box" approach to procuring spacecraft buses. Our challenge was to create an evaluation process that would be fair and consistent to offerors submitting proposals for the initial competition, as well as for offerors submitting proposals for on-ramp competitions over the contract's five-year effective period. The commercial procurement was carried out using NASA's Mid Range acquisition procedures. By using Mid Range procedures we were able to streamline the evaluation, and produce less documentation. Offers were evaluated to determine the lowest technically acceptable price. In the context of multiple awards, the lowest prices were those that were evaluated as fair and reasonable.

Proposals were received in early October and the evaluation team promptly and efficiently went to the task of evaluating them. Our initial evaluation was completed in early November, at which point discussions were held with the offerors determined to have a reasonable chance of being selected for award. We accepted revised proposals in early December, and completed our final evaluation in mid-December. On December 14th, the Evaluation Team met with Mr. James Moore, Director of Flight Programs and Projects, to select the contract awardees.

As a result of the selection meeting, the following offerors and their core spacecraft were selected for contract award:

Offeror	**Core Spacecraft System**
Ball Aerospace Systems Division Boulder, CO	BCP 600 BCP 2000
Lockheed Martin Missiles and Space Sunnyvale, CA	LM 900
Orbital Sciences Corporation Germantown, MD	PicoStar MicroStar LeoStar MidStar StarBus
Spectrum Astro Gilbert, AZ	SA 200S SA 200HP
Surrey Satellite Technology Ltd United Kingdom	MiniSat 400
TRW, Inc Redondo Beach, CA	T100 T200A T200B

The Rapid II contracts differ from the Rapid I contracts in several ways, providing increased service to our customers. Some of the changes and improvements in Rapid II include: an "on-ramp" that allows NASA to award new contracts and/or modify existing contracts to add additional core buses and options, annual

refreshment of core-bus technical details and options, the ability to purchase vendor-provided Delivery In-Orbit, and the ability to purchase individual spacecraft components on an emergency basis.

Awarded contracts have a minimum value of $50,000 and a maximum value of $1.5 billion for cumulative delivery orders, with a five-year ordering period. Contractors wishing to be included in Rapid II may submit a proposal during the first on-ramp in February 2000.

The Rapid Spacecraft Acquisition has been an incredible success. We look forward to continuing that success story with Rapid II. Congratulations to all contract awardees.

By Sharon Collingnon/RSDO Contracting Officer

Please Don't Forget

The RSDO strongly supports the consideration of small or disadvantaged businesses. Please make an effort to investigate whether the inclusion of such a business could benefit your team.

New Business

- Magnetospheric Mesoscale Satellites Study
- QuikTOMS Nears Bus Integration
- Swift Selected as MIDEX Mission
- CNOFS Not Utilizing RSDO

Magnetospheric Mesoscale Satellites Study

Toward the end of January, the RSDO will be issuing a Request for Offer (RFO) for the study of Magnetospheric Mesoscale Satellites (MMS) concepts. The challenge of this project is to pack five spacecraft on one launch vehicle. The MMS will fly in 2005. The spacecraft are conceived to have intersatellite signaling capability and to hold a tetrahedral formation of varying dimensions while investigating the Earth's Magnetosphere in a series of campaigns at different orbits.

By Bill Watson/RSDO

QuikTOMS Nears Bus Integration

On July 31, 1999 the Rapid Spacecraft Development Office awarded Orbital Sciences Corporation a contract for the development and flight of the QuikTOMS mission. The QuikTOMS mission is a thirteen month commercial development effort to fly the fifth in the series of Total Ozone Mission Spectrometer (TOMS) instruments. The TOMS-5 instrument will image the ozone quantity around the globe, and most notably, track the ozone hole as it expands and contracts as the seasons and upper level contaminates dictate.

The TOMS-5 instrument will fly on an Orbital Microstar satellite, which is scheduled for launch August 15, 2000. QuikTOMS will be the secondary payload in the Taurus fairing, sharing the ride with the primary satellite OrbView-4, and the tertiary satellite Special Design Bus (SDB)—an Orbital technology demonstration and communications satellite.

QuikTOMS' assembly is progressing well. To date the Initial Concept Review (a meeting where both the NASA and Orbital teams gather for introductions and initial ideas) and the Mission Design Review (a four-day informal peer review followed by a day-long formal review) have been conducted. Presently, the Project is planning on conducting the next formal review, the Instrument Integration Readiness Review (IIR), at the end of February. At the IIR, Project managers will examine the bus assembly and procedures to date to assure the spacecraft is ready for the instrument to be attached and testing to begin.

At this time major structural and electrical components are being delivered, and the Project is on the verge of satellite bus integration. The instrument has been extracted from storage, cleaned-up, tested, and calibrated. It was determined that present day instrumentation has gained in sophistication, allowing the Project to purchase a special laser for the use in the calibrating the instrument. This laser has provided calibration data better than that which could be obtained during the assembly several years ago, and better than that with which it was tested previously. This data will be very valuable once the first images are received.

For more information on the QuikTOMS mission visit the web site at http://quiktoms.gsfc.nasa.gov/

By Scott Greatorex/RSDO Mission Integration Manager

Swift Selected as MIDEX Mission

In November 1999, RSDO lifted the contingency on the delivery order to Spectrum Astro for the Swift satellite. NASA awarded this delivery order using the RSDO's Rapid I process and catalog. Stan Dubyn, Sr. Vice President and Chief Operating Officer for Spectrum Astro noted, "the use of Goddard's Rapid Catalog truly enabled reduced cost and risk as well as a flexible and robust spacecraft to accommodate the three Swift instruments. The tight coupling of the Principal Investigator and RSDO was a major benefit, creating synergism among the members of the Swift Team and allowing our proposal and Phase A design efforts to be worked thoroughly and efficiently."

The Swift Project was one of five MIDEX missions chosen earlier in 1999 to proceed into the MIDEX Announcement of Opportunity Step 2 process. In that process, project personnel conducted studies to further refine the requirements and implementation details for the mission, and wrote a final proposal to submit to the evaluation board. During this Step 2 process, the Swift project worked with Spectrum Astro to enhance and define the Swift instrument interface to the commercial spacecraft. Spectrum Astro supplied a required report, which contributed substantially to the final proposal, along with a price update to reflect the changes required since the original competition.

The Swift Project completed their preparations on the final proposal and delivered it to the MIDEX review board ahead of schedule. A long period of waiting ensued, as the board considered all of the proposals for selection and the NASA budget was resolved by Congress. Finally, in mid-October 1999, the MIDEX announcement was released and the RSDO discovered that one of their supported projects—Swift—had won.

In November the RSDO released the contingency on the delivery order and gave Spectrum-Astro permission to proceed with the planning and development of the satellite bus that would hurtle the three Swift payloads through space and guide them to the intended targets of scientific interest.

The RSDO wishes the Swift project and Spectrum Astro luck in their progress toward eventual launch. (P.S. Don't forget to included the RSDO logo on the launch vehicle fairing!)

By Scott Greatorex/RSDO Mission Integration Manager

CNOFS Not Utilizing RSDO

We recently received word that the Communication Navigation Outage Forecasting System (CNOFS) dedicated acquisition will be provided by a means other than the RSDO. While we believe RSDO could have afforded a viable service option, we wish them the best in their endeavors.

Rapid II: The Technical Perspective

The Rapid II Acquisition resulted in the acceptance of proposals from six vendors for fourteen buses. (For more on the Rapid II proposal evaluation process, click here.) The buses present a range of capabilities that can be modified to meet the unique requirements of most missions. Core bus payload accommodation capabilities range from 10 to 750 kg, and from 10 to 1300 watts. Baseline orbits include Low Earth Orbiting (LEO), Sun Synchronous, Geosynchronous Earth Orbiting (GEO), and Deep Space. These capabilities are baseline and can be modified to meet individual mission needs. In addition, new buses will be added to the catalog which may expand these baseline capabilities.

The baseline scope of work includes:

- spacecraft build and test
- interface control document generation and interface integration
- mission-unique modification design
- instrument integration and test
- environmental test
- shipment to launch site
- launch vehicle integration support
- on-orbit checkout
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Non-baseline services which can be obtained from the spacecraft vendor when purchasing a bus include Spacecraft Operations, Networks and Mission Operations, and Launch Services. Accommodation assessments (studies) can also be performed during the mission formulation phase to verify the capability of the contract buses to meet customer needs.

It should be noted that the Rapid Spacecraft Acquisition (RSA) program is not a fit for every mission, but is most appropriate for missions which have the flexibility to wait until instrument and ground system interfaces mature. Using RSA, significant cost savings can be realized without compromising reliability, performance, or safety.

By Ron Miller/ RSDO Mission Integration Manager

RSDO Maps Out the Future

To evaluate its business prospects, the RSDO project has commissioned Booz·Allen & Hamilton Inc. to survey the landscape of future missions, and produce a business opportunity roadmap. This roadmap illustrates RSDO's current mission commitments, along with planned NASA and non-NASA unmanned missions. The RSDO and its customers can use the roadmap to identify and plan for potential future business opportunities.

The chart is available in a PDF version, and illustrates future schedules in a "swim-lane" format. Where available, the roadmap contains embedded links to the web sites of programs, projects, announcements of opportunity (AO), and conferences it depicts.

Please feel free to preview or download the RSDO roadmap at http://rsdo.gsfc.nasa.gov/newsletter/roadmap.htm.

The roadmap is divided into five sections:

1. RSDO – This section of the roadmap illustrates RSDO contract lifetimes and the current and future missions for which RSDO is providing a spacecraft bus. "On Ramp" milestones indicate when RSDO allows vendors to add new spacecraft buses to the catalog.
2. Launch Dates – This section provides launch dates for planned missions (NASA and non-NASA) between the years 2000 and 2006 that have not yet selected a spacecraft bus.
3. NASA Enterprises – This section is divided into two parts: Code Y (Earth Science) and Code S (Space Science). A time line is used to illustrate the mission development process for missions with RSDO support potential. The time line begins with the release of the AO, continues through the proposal and award process, and ends with mission implementation.
4. Other Agencies – This section illustrates future non-NASA mission opportunities. The non-NASA agencies include the Department of Defense, U.S. Air Force, National Oceanic and Atmospheric Administration, CNES (France's Space Agency), DLR (German Space Agency), National Space Development Agency (Japan), and the European Space Agency.
5. Conferences/Symposiums – This section provides dates for future conferences that RSDO representatives or customers may wish to attend to encourage RSDO spacecraft bus procurement and to stay current on spacecraft technologies.

The roadmap is an excellent tool for advanced planning and organization for the RSDO and its customers. It also serves as a reference for all parties interested in the mission development process for Earth and Space Science Missions and as a good overview of NASA's programs and projects within the Earth and Space Science Enterprises. The roadmap will be maintained regularly, with updates posted on the RSDO web site, and highlighted in this newsletter.

Please forward any questions or comments regarding the RSDO roadmap to Bill Watson via email at bill.watson@gsfc.nasa.gov.

By David Bissett/Booz·Allen & Hamilton Inc.

New RSDO Web Site Unveiled

The RSDO is pleased to announce that a new RSDO web architecture in will soon be released. With the aid of Oleg Volkov (Booz·Allen, & Hamilton Inc.) the RSDO web site will have a brand new look and feel, with the latest in navigation aids (buttons, streaming banners, etc.). The GSFC Odin contract will provide the required servers and GSFC Security-approved firewalls to help maintain the integrity and manage accessibility of Rapid Spacecraft Acquisition (RSA) information.

Many of the current web site's features will be preserved, including the capability for delivery and receipt of Request For Offer (RFO) and DO material. Pages displaying information about the RSDO and providing access to related links will continue to be available. Behind the scenes, tools will be in place to allow easier site maintenance by the RSDO staff, enabling us to provide timely updates and improved quality of information.

We are sensitive to your needs and understand that some viewers experience data rate constraints when it comes to web access. With the new architecture, the responsiveness of our site will be improved. When large files are necessary, we will warn you.

Please direct your comments to bill.watson@gsfc.nasa.gov .

By Bill Watson/ RSDO

Available Goddard Space Flight Center Services

As we enter the 21st century, economic, political, and technical environmental factors dictate that NASA conduct business at affordable cost and incur minimal risk—all while maximizing scientific return. With this in mind, NASA established its Intelligent Synthesis Environment (ISE) initiative in 1999. This new NASA initiative is devoted to creating a rapid and distributed systems design and execution environment for NASA and its partners. NASA's Langley Research Center is leading the ISE effort, and all NASA centers and enterprises are participating.

Within ISE, NASA is developing the capability for scientists and engineers to work together in a virtual environment, using computational simulations and other tools to model the complete life cycle of a product/mission. When this modeling process is employed before commitments are made to produce physical products, significant savings are realized in the life cycle costs of a mission.

Goddard Space Flight Center has developed several resources and facilities to provide mission development products and services to the science and engineering communities. These facilities and resources enable the rapid formulation and execution of missions, and are key elements of NASA's ISE initiative.

In addition to the services offered by the Rapid Spacecraft Development Office (RSDO), NASA and its partners may avail themselves of mission development services from the following GSFC organizations:

- Access to Space (ATS) Group
- Integrated Mission Design Center (IMDC)
- Instrument Synthesis and Analysis Laboratory (ISAL)

Services from these organizations may be used in concert or discretely, depending on the needs of the customer. For more information on any of these GSFC teams, including points of contact and web site links, please click on the organization's name above.

Access to Space (ATS) Group

The Goddard Space Flight Center's Access to Space (ATS) Group supports the development and implementation of mission concepts by identifying potential opportunities for cost effective access to space.

Through partnerships established with global access providers, the ATS Group has created an access to space "portal" located at: http://accesstospace.gsfc.nasa.gov

This interactive web site provides up-to-date information on access to space opportunities, technology development efforts within NASA, and details regarding the various "access modes" available. The information is available free of charge, to any investigator with Internet access.

The ATS opportunity database is divided into three categories:

- Funded and manifested missions, including availability of excess volume/performance
- Proposed missions that have funding for launch, but not enough to cover the entire cost of the vehicle they are manifested on
- Future concepts that do not have funding for launch but are looking for potential partners and/or launch opportunities.

The "access mode" information within the ATS site is essentially an abbreviated User's Guide for the various reusable and expendable launch vehicles, sounding rockets, Shuttle, and balloons available. This

information is fully searchable, and users can compare different vehicles side by side by opening multiple browser windows.

In addition to the information provided on its web site, the ATS Group can provide the following consulting services at a nominal cost:

- "Quick look" summary access mode/opportunity assessments
- Comprehensive access mode/opportunity assessment packages
- Facilitating/coordinating linkage of Investigators with suppliers

The ATS Group works closely with its various partners (such as The Expendable Launch Vehicles Office at the Kennedy Space Center and the USAF's Space Test Program) in conducting all of these efforts to ensure that products are as comprehensive and up-to-date as possible.

To inquire about ATS consulting services, please contact Mr. William Cutlip of the ATS Group.

Email address: william.e.cutlip.1@gsfc.nasa.gov
Business phone: (301) 286-0438
Fax number: (301) 286-0232

Integrated Mission Design Center (IMDC)

The NASA Integrated Mission Design Center (IMDC), located at the Goddard Space Flight Center (GSFC), provides specific mission engineering analysis and end-to-end mission design products to the science and engineering communities. IMDC capabilities include:

- Full end-to-end mission studies including system/subsystem concepts, requirements and trades
- Focused studies
- Independent assessments of Investigator-provided studies/concepts
- Use of new technologies and risk assessments

IMDC mission design sessions typically last one full week and are tailored to fit an investigator's specific mission requirements. The IMDC will provide support ranging from one day brainstorming sessions to an extended design session, as required. IMDC personnel will work with the Investigator Team prior to the mission design session to understand the mission goals and objectives, the science driving requirements, the instrumentation, mission configuration, architecture, and the goals of the IMDC session. The Investigator is a key member of the IMDC process and during the study period is the integral decision-making member in the IMDC. This partnership engages the Investigator in the design process and provides him/her the opportunity to influence and refine the mission study objectives throughout the design process. This process enables the IMDC to make the best decisions in real time and has been proven to result in a superior product to meet the Investigator's needs.

Initial IMDC interaction with Investigators will result in the understanding of Investigators' needs, the development of strategies to meet these needs, and the scheduling of follow-up IMDC activities as deemed necessary.

To obtain more information regarding the use of the IMDC, Investigators should contact Ms. Ellen Herring, IMDC Operations Manager, at the address/numbers below, or visit the IMDC web page at http://imdc.nasa.gov/.

Email address: ellen.herring@gsfc.nasa.gov
Business phone: (301) 286-7393
Fax number: (301) 286-0343

Instrument Synthesis and Analysis Laboratory (ISAL)

The Instrument Synthesis and Analysis Laboratory (ISAL), became operational in February 1999. The ISAL's Vision is: To greatly accelerate GSFC's capability to create, design, validate and operate new remote sensing instruments by providing an institutionalized engineering capability for the end-to-end instrument design, simulation and analysis spanning the entire life cycle from concept, through phase C/D and operations.

To implement this long-range vision, ISAL has adopted the following objectives:

- Provide a rapid and sustainable instrument development environment with clear, efficient processes and tools, re-usable models and skilled engineers
- Provide a capability for quick and efficient trade studies of instrument architectures and concepts
- Streamline and optimize instrument systems design for the entire life cycle, including cost and technology assessment
- Provide detailed multi-disciplinary modeling and analysis for phase C/D design validation and for operational investigations

The ISAL currently performs instrument concept designs and feasibility studies. This work can take on three forms: (1) the ISAL manager assembles an entire discipline engineering team and uses the ISAL for an end-to-end development effort, (2) the instrument scientist or project manager uses the ISAL with his own team, and (3) focused studies are performed to support the pre-work activities or to satisfy a specific question.

The ISAL team has a flexible process for the development of instrument concepts. First an initial interview is conducted to determine compatibility between the ISAL and the customer. Then enough information is compiled to allow the discipline team to begin work. Next a kick-off meeting is held, including science and systems presentations, and question and answer sessions. As work progresses, daily meetings with the whole team are held to share status, brainstorm, and determine necessary splinter discussions. Minutes of these sessions are distributed daily. Collaborative sessions in the ISAL for multi-discipline design and problem solving and ad hoc tag-ups to complete the design effort are held as needed. Finally, the ISAL presents a final oral briefing to the scientists, and presents them with a CD-ROM containing all briefing material, reports, models and analyses.

ISAL customers will realize several proven benefits:

1. Increased engineering efficiencies and improved instrument system design
2. More concurrent, concentrated time for the design team
3. Institutionalized re-usable process and models, and consistent products

For more information on the ISAL visit the ISAL web site at http://isal.gsfc.nasa.gov , or contact William Hayden, the ISAL Manager/Team Leader.

Email address: william.hayden@gsfc.nasa.gov
Business phone: (301) 286-5127
Fax number: (301) 286-6063

New Address for RSDO

Since RSDO joined the Mission Services Program in August 1999, our mail code has changed from Code 405.1 to Code 456. Please make a note of this for all correspondence.